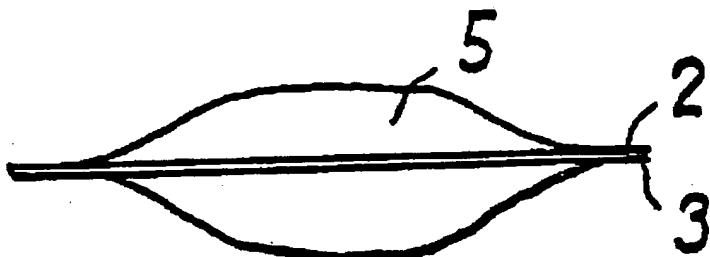


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## PACKAGE FOR WATER-CONTAINING SUBSTANCES

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**Abstract:** A filled package (1) for dissolution in water comprises a sealed water soluble packaging (2, 3) containing a concentrated aqueous syrup of at least one substance, the concentration of the at least one substance in the aqueous syrup being sufficiently high so that at storage temperature the water in the aqueous syrup does not attack or dissolve the packaging (2, 3) to the extent that over the desired storage period the package (1) is not ruptured.

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## Detailed Description

Package for water-containing substances.

I 1 The present invention relates to methods of packaging, and packages of, water containing substances such as foodstuffs, medicines, and other substances for human consumption, and of water containing substances not for human consumption such as agricultural chemicals, in water soluble packaging.

It has long been desirable to present concentrated water containing substances in the form of syrups, such as honey; honey or sugar mixtures with alcoholic drinks such as whisky or rum; honey or sugar mixtures with soft drink essences; with flavourings for beverage or culinary use; with drugs, particularly for pediatric use; and with other fluid water containing substances in convenience

packaging containing a single known measure and in which the packaging itself dissolves in water. The advantages of such packaging are that the contents may be precisely weighed in single dose quantities and hermetically sealed ready for use.

Moreover, in use in dissolving in water because the packaging itself can be put into the water and will dissolve completely, the user has no messy packaging to dispose of and can be sure that the entire contents of the package have been mixed. Hence accurate formulation of the desired end product can be achieved without needing to weigh or measure often small amounts of concentrated essence, flavouring, sweetner or the like.

This is especially important in dealing with consumers and with sticky products such as honey and many pediatric medicines, or potentially harmful products such as 3o agricultural chemicals.

1- In this specification the term syrup is used generically to include within its ambit concentrated aqueous solutions, precipitates cc suspensions of any appropriate substance whether it be of a sweet, bland, sour, salt or other tasting food substance or mixture of food substancespor be a pharmaceutical, medical, or agricultural chemical substance or mixture of substances.

Turning now to honey, by way of example, a large proportion of the current production of honey is used for sweetening hot or cold drinks. The syrupy nature of honey makes this operation more difficult than the use of granular sugar. This difficulty is most severe in commercial beverage dispensin4, whether by beverage dispensing machines or in premises such as cafes and restaurants. Containers of honey available for customers' use will rapidly become contaminated with honey on their outsides making them sticky and unattractive.

Honey is difficult: to extract from any small container which might be provided containing a small quantity of honey suitable for sweetening an individual drink. Previously also any flavouring essence of the drink has been added separately from the honey.

Granular sugar itself presents some disadvantages in use. It is a solid, and can 1 be slow to dissolve in water. It cannot be used with flavouring essences in liquid form, in convenient single use prepacks, in a form in which the packaging does not have to be separately disposed of.

Salts, such as gravy and sauce mixes and meat extracts have also hot been sold in a single use ON with the exception of solid powdered cubes, for reasons similar to sugar; if they have been sold as powders these require careful measuring, and if liquid, then the packaging has to be disposed of separately. Moreover, powdered gravy, sauce and other food substances such as custard are difficult to prepare without unpleasant and unpalatable lumps in the final product. In the case of flavouring essences, which are often in the form of concentrated syrups, the small quantities to be used have often been difficult to measure accurately, leading to uneven use and flavouring from one use to another.

Medicines are often presented as syrups, especially for pediatric applications, but such medicines are messy to use, and the dose administered varies with the size of the spoon used. Whilst medicines are often presented in gelatin capsules, these do not dissolve in the mouth and may be undesirable in some formulations.

Even where a substance is not for human consumption, it is useful to package it in packaging which can dissolve in water, so that the packaging does not have separately to be disposed of and so that messy or dangerous substances do not have to be handled, yet can be presented for use in precisely measured quantities.

1 Examples of such substances include aqueous based agricultural chemicals, for garden or farming use, detergents, and toiletries such as bath foamS.

Previously only solid or substantially water free substances aess than 10% water) have been proposed for presentation in water soluble packaging, although a laminated packaging with a water insoluble inner surface has been proposed.

The disadvantage of the latter, especially for food use, is the presence of an insoluble residue after contact with water.

Although water soluble packaging films are known and are commercially available, including films of modified vegetable materials such as methyl cellulose which are known to be edible and have been approved for human consumption, and films of polyvinyl alcohol, they have in the past, only been used for packaging solids or fluid (flowable) substances which are substantially free of unbound water. This is because the water-in water containing substances having substantial amounts of free water dissolved the film. Indeed, it has generally been considered that contact with fluid substances containing more than 2% of water should be sufficient to produce at least gradual dissolution of such films.

Accordingly, the main object of the present invention is to provide packages of water containing syrups, such as honey, in which the aforesaid - disadvantages are minimized or avoided.

Applicants believe that they have discovered, a principle, which is that the greater the concentration of the actual substance of a water containing substance, i.e. a syrup, then the greater the retention of the syrup inside water soluble packaging without dissolution of the packaging. Whilst Applicants are not entirely certain as to how the increased concentration provides for retention with no dissolution without

5 further experiments it is thought that the underlying principle involved may be osmosis.

In order to carry this principle into effect, the present invention consists in a method of packaging at least one water containing substance in a water soluble packaging material in which the at least one water containing substance is a syrup which is contained within the packaging by having a concentration which is sufficient to prevent the water in the syrup from attacking and dissolving the packaging until the packaging is wetted externally, by water or water containing liquid. Hereinafter water and water containing liquids, e.g. milk, will be generically referred to as water.

By means of the invention syrups of foodstuffs such as honey, medicines such as cough medicines, and agricultural chemicals such as herbicides can be retained within water soluble packages of water soluble film until wetted by water when the package and the syrup will be dissolved, leaving no residue of the package behind.

It is indeed surprising that the invention has made it possible to package honey and other concentrated aqueous syrups in such packaging, the packages remaining stable, i.e. dissolution is inhibited, until the user wets them, e.g. by immersion in water. Moreover, Applicants believe that if osmosis is involved in syrup retention it will also be involved in dissolution so that once the package has been wetted externally with water, the dissolution of the packaging and the dissolving of the syrup in the water will take place far more rapidly, which constitutes a considerable advantage.

From another aspect, the present invention also consists in a package for dissolution water, comprising a sealed water soluble packaging containing a concentrated aqueous syrup of one or more substances, the concentration of the substance or substances in the aqueous syrup being sufficiently high so that at a normal storage temperature (typically room temperature) the water in the aqueous syrup does not or is inhibited from attacking or dissolving the packaging to the extent that over the desired storage period the package is not ruptured.

Where the substance is honey, it may be of any consistency in which honey is usually available. The consistency may therefore range from a flowable liquid syrup (clear honey) to a stiff syrup containing much precipitated sugar (set honey). The honey may be mixed with other water soluble substances, such as flavourings, essences, colouring, or

concentrated alcoholic beverages, such as whisky or rum. Other substances, such as concentrated sugar solutions, salts from meat extracts for sauces and gravies, concentrated extracts of tea or coffee, concentrated aqueous solutions of bath foams, detergents or agricultural chemicals such as herbicides may be used in the present invention. Mixtures of substances may also be used. Furthermore, in the case of food substances such as gravies, sauces and the like freedom from lumps is ensured, since the solids in them are predissolved in water.

Sometimes the substances required to be stored is not highly soluble in water, so concentrated solutions cannot be achieved. In other cases, such as a flavouring, essence or medicine, only a small

but carefully measured amount of the active ingredient is required. Where either of these occurs, a carrier such as honey, or a concentrated sugar solution can be used to increase the bulk, or to ensure that the concentration of the aqueous syrup is sufficiently high that dissolution of or attack on the packaging material during storage is effectively prevented. It is immaterial that some of the substances in the package may be in the form of a precipitate, in suspension or in particulate solid form such as powdered herbs.

The package may be adapted for dissolution in hot water only, cold water only, or more preferably in hot or cold water by the choice of a suitable packaging material. The film used for packaging should be adapted so that it dissolves completely and does not form a gel at the highest temperature at which the package may ordinarily be immersed in water. Typically such temperatures should be 850C for hot beverages, gravies and sauces, 651C for bath water, and 450C for cold beverages and agricultural chemicals. The optimum characteristics of such films should include a fairly rapid dissolution time.

at the normal temperature of immersion in water when filled, with stirring or shaking if appropriate. Increasing the film thickness increases dissolution time.

Packaging materials are available having the necessary solubility properties. Examples of these are methyl cellulose films and polyvinyl alcohol films. Methyl cellulose films or derivatives thereof being made of a modified vegetable material are particularly preferred as they are safe for human consumption. Polyvinyl alcohol films should only be used where the solution in the package is not for human consumption, for example in weed killers or bath foams. Preferably cast film should be used as it has more consistent characteristics, but extruded film may be used, if appropriate.

Moreover, any other appropriate water soluble packaging materials may be used.

Such films have the advantage of being heat sealable, allowing easy formation of sealed packages containing aqueous syrups of virtually any desirable size. The size of the package may be for sweetening or flavouring an expected quantity of liquid for consumption such as an individual drink, or for an expected quantity of a sauce, or as a precise dose of a medicinal compound, or in a larger package for industrial culinary use or for packaging a measured quantity of an agricultural chemical.

A further advantage of the invention for culinary and beverage use is that both honey and modified vegetable materials in particular methyl cellulose are thickeners. Thus where it is desired to create a relatively viscous food, beverage or other packaged product according to the invention, the appropriate amount of thickener can be incorporated in the packaged substances, or by increasing the thickness of the packaging film or by a combination of both. The combination is determined by the speed of dissolution of the packaging, thicker packaging taking longer to dissolve, up to a maximum effective thickness, and the degree of added viscosity required. It is a novel feature of this invention that the packaging material can be used not only to contain the foodstuff or other product, but also as a thickener for the foodstuff or other product. This feature is particularly useful for cold drinks, sauce mixes and gravies, to give them body.

The honey or other syrup may be packaged into such packaging material by any of the methods for packaging liquids in plastics film packages conventionally used. These will include drawing a base sheet of plastics film by vacuum into wells to provide pockets which may be filled with the honey or other syrup and heat sealing a second layer of plastics over the first layer to provide joined packages which may then be separated for individual sale or may be sold in the joined form for separation by a user. The shape of the mould may be any suitable form for marketing purposes, such as hexagonal for efficient use of the packaging material, round, square, or in the shape of an animal or fruit. The surface of the film may be smooth, stippled or textured.

Similarly, packages may be formed by the technique of continuously forming a strip of film into a vertically running tube, continuously filling the tube with honey or other syrup, pinching and sealing the tube at spaced intervals horizontally to form a series of linked packages, and optionally separating the packages.

The film may have incorporated in it flavouring or colouring, and may have printing on it or lettering or other motifs moulded into it. Where appropriate, the flavouring, colouring or printing ink shall be

fit for human consumption. The film may also have incorporated in it other additives, to decrease oxygen permeability, and thus to increase the shelf life of the packaged product.

The package may be provided with an internal and/or external water soluble coating which may be e.g. a sugar or salt for example. It is preferred that in the packaging method adopted, the film is sealed to itself when necessary by heat sealing. However, the use of adhesives is also acceptable provided, where appropriate the adhesive is fit for human consumption.

The syrup may be contained in an individual package which may optionally be connected by the packaging material to other similar packages. Where the packages are inter-connected in this way, they are preferably separable from one another, e.g. by means of weak sections or perforations in the packaging material joining the said packages. In order that the invention may be more readily understood, reference will now be made, by way of example, to the accompanying drawing, in which:

Figure 1 is a plan view of one embodiment of a package which is made in accordance with the invention, and Figure 2 is an end view of the package of Figure 1.

As shown in Figure 1, a package according to the invention comprises packaging in the form of a sachet 1 composed of upper and lower sheets of polyvinyl alcohol or methylcellulose film 2, 3 joined together in a zone forming a continuous rectangular path 4 by heat welding to enclose a pocket 5 containing a concentrated aqueous syrup such as honey.

A sachet of this form containing honey may be dissolved in a drink for sweetening the drink and imparting a honey flavour.

By selecting the grade and nature of the film enclosing the sachet, it may be soluble in a cold drink such as milk, as well as in hot drinks.

The invention will now be further described with reference to the following Examples in which a number of suitable syrups contained in heat sealed tubular sachets of methylcellulose were made.

1) Honey alone 2) Sugar alone 3) Honey and rum 4) Honey and whisky 5) Honey and vanilla essence 6) Honey and blackcurrant flavouring 7) Honey and concentrated orange juice 8) Honey and Paracetamol (TM) 9) Honey and instant coffee (Nescale TM) 10) Honey and Chivas Regal AM 11) Honey and alcohol 12) Honey and fresh lemon juice 13) Bovril (TM) meat extract 14) Marmite AM 15) As purchased solutions of 16) Honey and bath foam (Fenial - TM) 17) Honey and liquid detergent (Fairy - TM)

It was found that all packages readily dissolved in water.

Where it is desirable that the packages of the invention not be handled, they may be stored in and dispensed from a dispenser.

It should be understood that many modifications and variations may be made without departing from the scope of the invention. For instance, the packaging may be of any other appropriate material than those described, need not be in the form of a flexible film, but may be of a stiffer nature imparting some structural rigidity to the package. Additionally, the requirement of wetting the outside of the package to dissolve it may be satisfied by water from the inside of the mouth, the stomach, or other similar sources.

## Claims

CLAIMS 1. A filled package for dissolution in water, comprising a sealed water soluble packaging containing a concentrated aqueous syrup of at least one substance, the concentration of the at least one substance in the aqueous syrup being sufficiently high so that at storage temperature the water in the aqueous syrup does not attack or dissolve the packaging to the extent that over the desired storage period the package is not ruptured.

2. A package as claimed in claim 1, in which the packaging consists of a heat sealable flexible film.

3. A package as claimed in claim 2, in which the gelation temperature of the film is greater than the temperature at which the packaging is to be dissolved after storage.
4. A package as claimed in any one of claims 1 to 3, in which the filled packaging is heat sealed to form an hermetic seal.
5. A package as claimed in any one of claims 1 to 4, in which the packaging acts as a thickener to the dissolved filled package.
6. A package as claimed in any one of claims 1 to 5, in which the packaging material has an internal and/or external water soluble coating to assist in retention of the syrup in the packaging.
7. A package as claimed in claim 6, in which the coating is a sugar.
8. A package as claimed in claim 6, in which the coating is a salt.
9. A package as claimed in any one of claims 1 to 8, ~~15~~ 1 in which the packaging material is methyl cellulose or derivatives thereof.
10. A package as claimed in any one of claims 1 to 9, in which both the packaging material and syrup are edible.
11. A package in accordance with any one of CLAIMS 1 to 10, in which the syrup contains honey, or mixtures of honey with other substances.
12. A package in accordance with any of claims 1 to 10, in which the syrup contains sugar or mixtures of sugars, alone or in admixture with other substances.
13. A package in accordance with any one of CLAIMS 1 to 10, in which the syrup contains at least one of the following; a flavouring, an essence, a salt such as a meat extract, a medicine or a beverage concentrate.
14. A package as claimed in any one of claims 1 to 13, in which the packaging material contains a colouring and/or flavouring.
15. A package as claimed in any one of claims 1 to 8, in which the film is polyvinyl alcohol.
16. A package as claimed in any one of claims 1 to 9 or claim 15, in which the syrup contains or consists of a toiletry or agricultural chemical substance.
17. A package as claimed in any one of the preceding CLAIMS in which the packaging material contains a colouring.
18. A package as claimed in any one of the preceding claims, in which the packaging material includes additives to suppress oxygen penetration through the packaging material.
19. A package as claimed in any one of CLAIMS 1 to 18, wherein the at least one water containing substance also contains a thickener.
20. A package as claimed in claim 19, in which the packing material and the thickener are the same or different material.
21. A method of packaging at least one water containing substance in a water soluble packaging in which the at least one water containing substance is a syrup which is contained within the packaging material by having a concentration of the substance which is sufficient to prevent the water in the syrup from attacking and dissolving the packaging material until the packaging material is wetted externally by water.
22. A method as claimed in claim 21, in which the packaging material is provided with an internal and/or external water soluble coating which assists in retention of the syrup within the packaging

material.

23. A method as claimed in claim 21 or 22, in which the packaging material is made from a modified vegetable material.

24. A method as claimed in any one of claims 21 to 23, in which the packaging acts as a thickener to the syrup.

25. A method as claimed in any one of claims 21 to 23, wherein the syrup includes a thickener which is the same or different material as that of the packaging material.

1 26. A method as claimed in claims 21 to 25, in which the dissolution temperature of the packaging is from about 450C to about 850C.

27. A method as claimed in claims 21 to 25, in which the dissolution temperature of the packaging is about 450C.

28. A method as claimed in claims 21 to 25, in which the dissolution temperature of the packaging is about 650C.

29. A method as claimed in claims 21 to 25, in which the dissolution temperature of the packaging is about 850C.

30. A method as claimed in claims 21 to 29, in which the syrup includes a carrier such as a sugar, honey or a salt for the active ingredient of the substance.

31. A package as claimed in any one of claims 1 to 20, in which the syrup includes a carrier such as a sugar, honey or a salt for the active ingredient of the substance.



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